

## Non-Toxic Ionic Liquid Fuels for Exploration Applications, Phase II

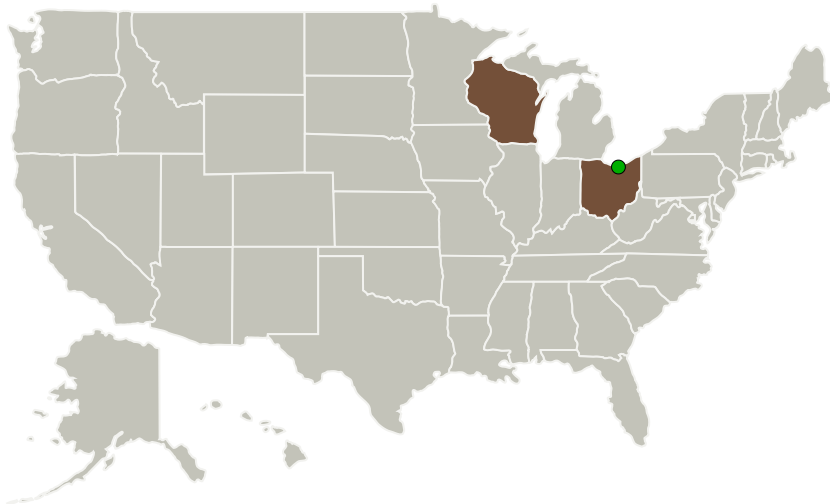
Completed Technology Project (2011 - 2013)



## Project Introduction

ORBITEC proposes to develop and test new, non-toxic ionic liquid fuels for propulsion applications. Vintage propulsion systems frequently use highly toxic propellants such as MMH. The toxicity of these propellants increases not only the risk of the missions but also the expense, due to special handling required during the entire lifetime of the propellant. Replacing toxic propellants with strong-performing, non-toxic formulations will significantly reduce the cost of propulsion systems. The Phase I project demonstrated the feasibility of developing several ionic liquid formulations that essentially equaled MMH in performance while offering low volatility and low toxicity. The Phase II work will continue the synthesis strategy to refine the formulations, conduct more extensive material property testing, conduct ignition delay tests, and demonstrate the fuels in a small-scale thruster. The collective result of these tasks will be the development and demonstration of new, safer fuels for propulsion applications.

## Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Sierra Nevada Corporation(SNC)	Lead Organization	Industry Women-Owned Small Business (WOSB)	Sparks, Nevada
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio
Orbital Technologies Corporation	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Madison, Wisconsin

## Primary U.S. Work Locations

Ohio	Wisconsin
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## Project Transitions

**June 2011:** Project Start**November 2013:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/139174>)

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Sierra Nevada Corporation (SNC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

Millicent R Coil

**Co-Investigator:**

Millicent Coil

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### Technology Maturity (TRL)

Start: **3**  
Current: **5**  
Estimated End: **5**



### Technology Areas

#### Primary:

- TX01 Propulsion Systems
  - └ TX01.1 Chemical Space Propulsion
    - └ TX01.1.2 Earth Storable

### Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System